

In the claims:

Cancel claims 1-3, 10, 14, 15 and 19 without estoppel or disclaimer of the subject matter thereof, and amend claims 4, 11, 12, 16-18 and 20, as follows:

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Currently Amended) ~~The digital signal processing unit of claim 1~~
~~further comprising~~ A system for filtering an analog input signal using a digital filter and analog feedback comprising:
a signal combiner for producing an analog output signal based upon an analog input signal and one or more analog feedback signals, the signal combiner having at least one input for receiving an analog input signal and the one or more analog feedback signals, and an output for outputting the analog output signal;
an analog-to-digital converter for converting the analog output signal into a digital data stream, the converter being communicatively coupled to receive the analog output signal from the signal combiner;

a digital signal processing unit for filtering the digital data stream being communicatively coupled to receive the digital data stream from the converter and to send at least one digital output signal to an analog feedback module for producing the one or more analog feedback signals based on the at least one digital output signal;

the analog feedback module being communicatively coupled to send the one or more analog feedback signals to the at least one input of the signal combiner;
and

a transfer function unit for receiving the digital data stream and applying a filter function, the transfer function unit further comprising:

a first integrator communicatively coupled to receive the digital data stream from the converter for generating a first digital output signal; and

a second integrator communicatively coupled to receive the first digital output signal from the first integrator wherein the second integrator generates a second digital output signal.

5. (Original) The digital signal processing unit of claim 4 wherein the first integrator comprises an up-down counter for generating the first digital output signal as a first carry out signal in two's complement form and wherein the second integrator comprises an up-down counter for generating the second

digital output signal as a second carry out signal in two's complement form.

6. (Original) The digital signal processing unit of claim 5 wherein a first gain module is coupled to receive the first digital output signal from the first integrator and is also coupled to send the first digital output signal with a respective gain factor to the analog feedback module wherein the first gain module is a bit shifter that shifts its respective digital output signal in two's complement form a number of bits to the left, the number of bits representing the respective gain factor.

7. (Original) The digital signal processing unit of claim 6 wherein a second gain module is coupled to receive the second digital output signal from the second integrator and is also coupled to send the second digital output signal with a respective gain factor to the analog feedback module wherein the second gain module is a bit shifter that shifts its respective digital output signal in two's complement form a number of bits to the left, the number of bits representing the respective gain factor.

8. (Original) The digital signal processing unit of claim 4 wherein the output of the transfer function is a second order bandpass filtered signal.

9. (Original) The digital signal processing unit of claim 4 wherein the

output of the transfer function unit is a lowpass filtered signal.

10. (Cancelled)

11. (Currently Amended) ~~The analog feedback module of claim 1 further comprising~~ A system for filtering an analog input signal using a digital filter and analog feedback comprising:

a signal combiner for producing an analog output signal based upon an analog input signal and one or more analog feedback signals, the signal combiner having at least one input for receiving an analog input signal and the one or more analog feedback signals, and an output for outputting the analog output signal;

an analog-to-digital converter for converting the analog output signal into a digital data stream, the converter being communicatively coupled to receive the analog output signal from the signal combiner;

a digital signal processing unit for filtering the digital data stream being communicatively coupled to receive the digital data stream from the converter and to send at least one digital output signal to an analog feedback module for producing the one or more analog feedback signals based on the at least one digital output signal;

the analog feedback module being communicatively coupled to send the one or more analog feedback signals to the at least one input of the signal

combiner; and

a second digital to analog converter for converting ~~the~~ a second digital output signal to a second analog feedback signal, the second digital to analog converter being coupled to receive the second digital output signal and being coupled to send the second analog feedback signal to the at least one input of the signal combiner.

12. (Currently Amended) ~~The analog feedback module of claim 10 further comprising~~ A system for filtering an analog input signal using a digital filter and analog feedback comprising:

a signal combiner for producing an analog output signal based upon an analog input signal and one or more analog feedback signals, the signal combiner having at least one input for receiving an analog input signal and the one or more analog feedback signals, and an output for outputting the analog output signal;

an analog-to-digital converter for converting the analog output signal into a digital data stream, the converter being communicatively coupled to receive the analog output signal from the signal combiner;

a digital signal processing unit for filtering the digital data stream being communicatively coupled to receive the digital data stream from the converter and to send at least one digital output signal to an analog feedback module for

producing the one or more analog feedback signals based on the at least one digital output signal;

the analog feedback module being communicatively coupled to send the one or more analog feedback signals to the at least one input of the signal combiner;

a digital to analog converter for converting the digital output signal to an analog feedback signal, the digital to analog converter being coupled to receive the digital output signal and being coupled to send the analog feedback signal to the at least one input of the signal combiner; and

a resistance across which ~~the first~~ an analog feedback signal is transferred from the digital to analog converter to the at least one input of the signal combiner.

13. (Currently Amended) ~~The analog feedback module system~~ of claim 12 wherein the resistance is implemented as a switched capacitance.

14. (Cancelled)

15. (Cancelled)

16. (Currently Amended) ~~The method of claim 14~~ A method for filtering an analog input signal using a digital filter and analog feedback comprising:

producing an analog output signal based upon an analog input signal and one or more analog feedback signals;

converting the analog output signal into a digital data stream;

applying a first digital transfer function to the digital data stream resulting in a first digital output signal;

converting the first digital output signal to one of the one or more analog feedback signals, wherein applying a first digital transfer function to the digital data stream resulting in a first digital output signal comprises:

applying a second order bandpass filter transfer function.

17. (Currently Amended) ~~The method of claim 15~~ A method for filtering an analog input signal using a digital filter and analog feedback comprising:

producing an analog output signal based upon an analog input signal and one or more analog feedback signals;

converting the analog output signal into a digital data stream;

applying a first digital transfer function to the digital data stream resulting in a first digital output signal;

converting the first digital output signal to one of the one or more analog feedback signals;

applying a second digital transfer function to the digital data stream
resulting in a second digital output signal; and wherein applying a second digital
transfer function to the digital data stream resulting in a second digital output
signal comprises:

applying a lowpass filter transfer function.

18. (Currently Amended) ~~The method of claim 15~~ A method for filtering an
analog input signal using a digital filter and analog feedback comprising:

producing an analog output signal based upon an analog input signal and
one or more analog feedback signals;

converting the analog output signal into a digital data stream;

applying a first digital transfer function to the digital data stream resulting
in a first digital output signal;

converting the first digital output signal to one of the one or more analog
feedback signals;

applying a second digital transfer function to the digital data stream
resulting in a second digital output signal; and wherein applying a first digital
transfer function to the digital data stream resulting in a first digital output signal
includes generating the first digital output signal as a first carry out signal in
two's complement form and wherein applying a second digital transfer function

to the digital data stream resulting in a second digital output signal includes generating the second digital output signal as a second carry out signal in two's complement form.

19. (Cancelled)

20. (Currently Amended) ~~The system of claim 19~~ A system for filtering an analog input signal using a digital filter and analog feedback comprising:

means for producing an analog output signal based upon an analog input signal and one or more analog feedback signals;

means for converting the analog output signal into a digital data stream;

means for digitally filtering the digital data stream resulting in a first digital output signal; and

means for converting the first digital output signal to one of the one or more analog feedback signals, wherein the means for digitally filtering the digital data stream ~~of claim 19~~ further comprises means for applying a filter function being communicatively coupled to receive the digital data stream, the means for applying a filter function further comprising:

means for generating a first digital output signal being communicatively coupled to receive the digital data stream from the means for converting;

means for generating a second digital output signal being communicatively coupled to receive the first digital output signal from the means for generating a first digital output signal; and

wherein the means for producing the one or more analog feedback signals comprises means for converting the first digital output signal to a first analog feedback signal being coupled to receive the first digital output signal and being coupled to send the first analog feedback signal to the means for producing an analog output signal; and

means for converting the second digital output signal to a second analog feedback signal being coupled to receive the second digital output signal and being coupled to send the second analog feedback signal to the means for producing an analog output signal.